

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification<sup>6</sup> :

B60R 9/10, E05B 67/00, 73/00

A1

(11) International Publication Number:

WO 96/26085

(43) International Publication Date:

29 August 1996 (29.08.96)

(21) International Application Number: PCT/SE96/00231

(22) International Filing Date: 21 February 1996 (21.02.96)

(30) Priority Data:

9500650-8

22 February 1995 (22.02.95)

SE

(71) Applicant (for all designated States except US): INDUSTRIAL THULE [SE/SE]; P.O. Box 69, S-330 33 Hillerstorp (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): JOHANSSON, Lars-Olof [SE/SE]; Gumpebo, S-514 95 Grimsås (SE).

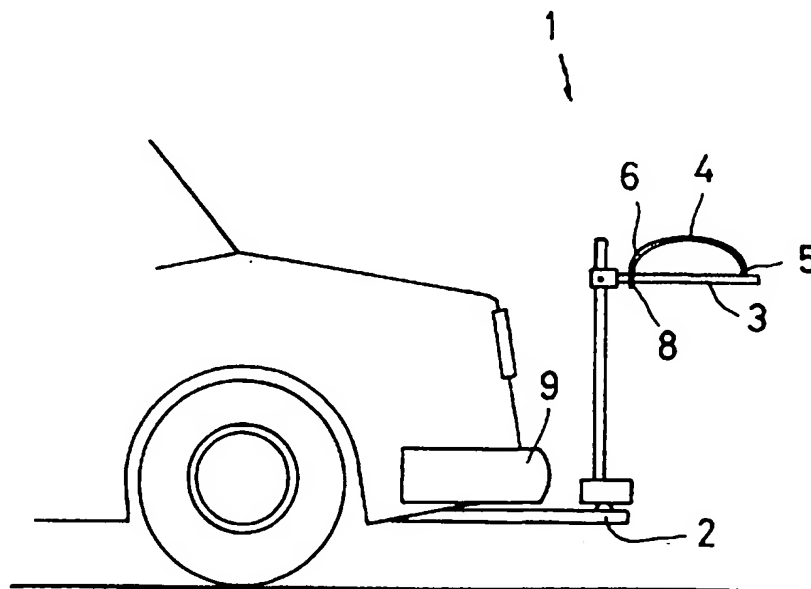
(74) Agent: WALLENGREN, Yngvar; Patentbyrå Y. Wallengren AB, P.O. Box 116, S-331 21 Värnamo (SE).

(81) Designated States: CA, DE, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published

With international search report.

(54) Title: LOCKING APPARATUS



## (57) Abstract

An apparatus for fixedly locking a load on a load carrier (1) comprises a wire (4) and a locking device. The locking device is fixed on or in the load carrier (1). A first end portion (5) of the wire is fixedly lockable, and a second end portion (6) is fixedly lockable in the load carrier, preferably in that the second end portion has a loop (8) which is passed over a part (3) of the load carrier (1).

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LJ	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

## LOCKING APPARATUS

### TECHNICAL FIELD

- 5 The present invention relates to an apparatus for fixedly locking a load on a load carrier, and comprising a wire, cable, chain or the like and a locking device in which a first end portion of the wire is fixedly lockable.

### BACKGROUND ART

10

Cable or wire locks of different types are previously known in the art for preventing the theft of various objects such as bicycles, wind surfing boards etc., on the one hand when these are being transported exteriorly on a vehicle, but also when they left parked or otherwise unattended.

15

A wire lock of this type has, at one end of the wire, a lock fitting which is insertable in a locking device which is fixedly secured in the opposite end of the wire. Hereby, the wire lock may be passed around a fixed object in order to lock and immobilise the bicycle or wind surfing board to the fixed object.

20

Wire locks of varying lengths are also known in the art.

25

It is also known to provide, on vehicle-borne load carriers, permanently mounted - and often integral in the load carrier - locking apparatuses by means of which, for instance skis, bicycles, wind surfing boards etc. may be locked in place in the often purpose-designed carrier or holder.

30

As far as prior art wire locks are concerned, these may function well enough, on condition that they are to hand when really needed. As regards purpose-built holders or carriers with integral locking means, these are specifically adapted to fit a given type of load. In addition, they are expensive and complicated in manufacture and are not flexible in practical application.

### PROBLEM STRUCTURE

35

The present invention has for its object to design the apparatus described by of introduction such that it may, in a simple and reliable manner, be

employed for fixedly locking different types of loads, for example bicycles, on a vehicle-borne load carrier. The present invention also has for its object to realise an apparatus which combines the simplicity and economy of the prior art wire lock with the reliability of purpose-built locking apparatuses, together with their admirable property of always being to hand when needed. Finally, the present invention also has for its object to realise a locking apparatus which may be marketed as an accessory or retrofit supplement to an existing load carrier.

## 10 SOLUTION

The objects forming the basis of the present invention will be attained if the apparatus intimated by way of introduction is characterized in that the locking device is secured on or in the load carrier and that the wire is securable in the load carrier with its other end portion.

Suitably, according to the present invention the wire is also provided, at its other end portion, with a loop which is passed over a part of the load carrier.

As a result of these characterizing features, an apparatus will be realised which is flexible in practical application and which may readily be mounted or retrofitted to an existing load carrier for fixedly locking different types of loads thereon.

Further advantages will be attained if the subject matter of the present invention is also given one or more of the characterizing features as set forth in appended Claims 3 and 4.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with particular reference to the accompanying Drawings. In the accompanying Drawings:

Fig. 1 is a side elevation of a rear portion of a vehicle and a bicycle carrier or holder mounted thereon;

Fig. 2 is an exploded view of a locking device included in the carrier according to Fig. 1;

Fig. 3 is a vertical section through the locking device of Fig. 2; and

Fig. 4 is a horizontal section through the locking device of Fig. 2.

#### DESCRIPTION OF PREFERRED EMBODIMENT

Fig. 1 shows, by way of example, a cycle carrier or holder 1 which is mounted on the drawbar ball 2 of a vehicle. The cycle holder has a carrier fork with substantially horizontal and mutually parallel legs 3 which are intended for carrying one or possibly more cycles (not shown on the Drawing). The subject matter of the present invention comprises a wire 4, a chain or similar flexible means which possesses good mechanical strength and is intended to be laid around a part of the cycle so that this is fixedly locked in place on the load carrier or holder 1. In its first end 5, the wire has means (not shown in Fig. 1) for fixedly locking in a locking device provided on or in the load carrier 1. The other end 6 of the wire is designed for fixedly securing to the load carrier 1. The first end 5 of the wire is suitably provided with a pin-shaped fitting 7 (Cf. Figs. 2 and 3), which is intended to be inserted in and fixedly locked in the locking device. The other end 6 of the wire 4 has, in the illustrated embodiment, a loop 8 which surrounds or is passed onto the leg 3 of the load carrier.

While the load carrier in Fig. 1 has been exemplified as a cycle holder intended for mounting on the drawbar ball 2 of a vehicle, it will be obvious to the skilled reader of this specification that any type of load carrier whatever may be relevant according to the present invention. Thus, the load carrier may be a load rack or holder which is mounted on the roof of a vehicle, or a cycle holder which is supported on the fender or bumper 9 of the vehicle and secured by clamping means or similar devices to the boot lid of the vehicle. According to the invention, the expression "load carrier" should therefore be interpreted in a broad sense and not be restricted to the embodiment illustrated in Fig. 1.

The locking device for the first end of the subject matter of the present invention may, as was intimated above, be placed interiorly in the load carrier 1, but may also be permanently secured on the outside of the carrier. In the illustrated embodiment, the locking device is placed interiorly in the load carrier, more specifically at the free end of its load carrying leg 3.

Fig. 2 shows the design and construction of the locking device in exploded view, and it will be apparent that the leg 3 has an opening 10 and that the locking device is insertable in the open end portion of the leg. For mounting the locking device, use is made of a sleeve fitting 11 which is preferably of plastic and which, on its outside, has grooves or lands which may be compressed or deformed in response to varying tolerances interiorly in the tube from which the leg 3 has been produced. The sleeve fitting 11 has an opening 12 which, when the sleeve fitting is inserted to the correct position in the open end portion of the leg 3, lies in register with the opening 10 of the leg.

The locking device further includes an outer sleeve 13 which may be inserted in the sleeve fitting 11 and which in itself accommodates a lock cylinder 14, a twist operating portion 15, a sliding bolt 16 and a guide 17 for the sliding bolt.

The lock cylinder 14 has a rotary driver 18 which may be rotated within a certain angle interval by the action of a key. The driver 18 is interiorly housed in the operating portion 15 and is rotationally fixed in relation to the operating portion so that the operating portion 15 follows the rotational movements of the driver coaxially with the longitudinal direction of the locking device and thereby also coaxially with the longitudinal direction of the leg 3.

At its end surface facing away from the lock cylinder 14, the operating portion 15 has helical ramp surfaces 19 against which abut the end surfaces 20 of the sliding bolt 16. Given that the sliding bolt 16 is accommodated in grooves 21 in the guide 17 and cannot, therefore, rotate together with the operating portion 15, a rotation of the operating portion 15 will entail an axial displacement of the sliding bolt 16 so that it is movable between a

locking position where it engages with the pin-shaped fitting 7, and an open position where it is slid in a direction to the left in Fig. 2 and where it thus releases the pin-shaped fitting 7 so that this may be withdrawn out through the mutually aligned openings 10, 12 and 22 in the leg 3, the sleeve fitting 11 and the outer sleeve 13, respectively. Springs 23 are employed for returning the sliding bolt 13 to abutment against the ramp surfaces 19 and towards the closure position.

By placing the locking device interiorly in the leg 3 of the load carrier and by inserting the end fitting 7 of the wire 4 through an opening 10 in the leg and into the locking device for fixedly locking thereof, the locking device is positionally fixed in the leg 3 when the wire is locked. No separate securement of the locking device will therefore be necessary above and beyond that which is realised by the tight fit between, on the one hand, the sleeve fitting 11 and the leg, and the sleeve fitting 11 and the outer sleeve 13 on the other. It is, therefore, a simple matter to provide a retrofit to an existing load carrier if this is provided with a correctly placed opening 10.

As an alternative to the placing of the locking device interiorly in the leg 3, an arrangement is conceivable on other types of load carriers in which a short sleeve is welded (or fixed by other appropriate means) to a suitable place on the load carrier, the sleeve then corresponding to the open end portion of the leg 3 as this has been described according to the present invention.

Instead of the above-disclosed loop 8 at the other end of the wire 4, it is of course possible to secure the wire by other means. For example, the other end of the wire may be provided with a head which is of greater diameter than the pin-shaped end fitting 7. As a result of such design and construction, the whole wire 4 may be passed, with the end fitting 7 first, through an opening which is sufficiently large to allow the passage of the end fitting, but insufficient to allow the passage of the head on the other end 6 of the wire.

It is also possible to permanently secure the other end 6 of the wire 4 in the load carrier. Thus, the other end of the wire may be provided with a sheet

metal lug (similar to a cable lug) which has an aperture for a rivet or other anchorage device by means of which the end fitting is secured in the load carrier.

- 5 The present invention may be further modified without departing from the spirit and scope of the appended Claims.



## WHAT IS CLAIMED IS:

1. An apparatus for fixedly locking a load on a load carrier (1), and comprising a wire (4), a cable, a chain or the like and a locking device in which a first end portion (5, 7) of the wire is fixedly lockable, characterized in that the locking device is secured on or in the load carrier (1); and that the wire (4) is fixable in the load carrier with a second end portion (6).
2. The apparatus as claimed in Claim 1, characterized in that the wire (4) has, at its other end portion, a loop (8) which is passed over a part (3) of the load carrier (1).
3. The apparatus as claimed in Claim 1 or 2, characterized in that the locking device is disposed interiorly in an open end portion of the tubular part (3) of the load carrier (1); and that the tubular part (3) has an opening (10) through which the first end portion (5, 7) of the wire (4) is insertable for fixedly locking in the locking device, whereby the locking device is positionally fixed in the load carrier when the wire is fixedly locked in place.
4. The apparatus as claimed in Claim 3, and in which the tubular part is a leg (3) in a load carrying fork in a vehicle-borne cycle holder or carrier (1), characterized in that the locking device is placed in an outer end region of the leg (3); that the loop (8) is disposed about an inner portion of the leg; and that the wire (4) therebetween extends about a portion of a cycle which rests on the leg.

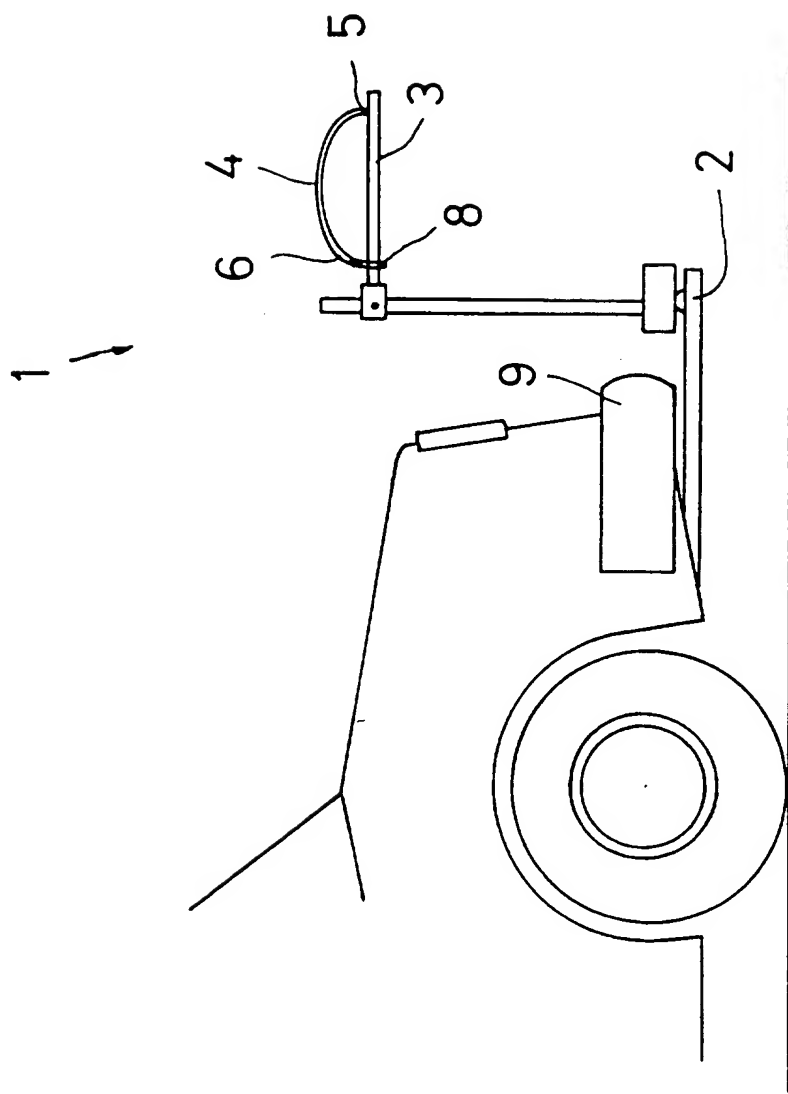


Fig 1

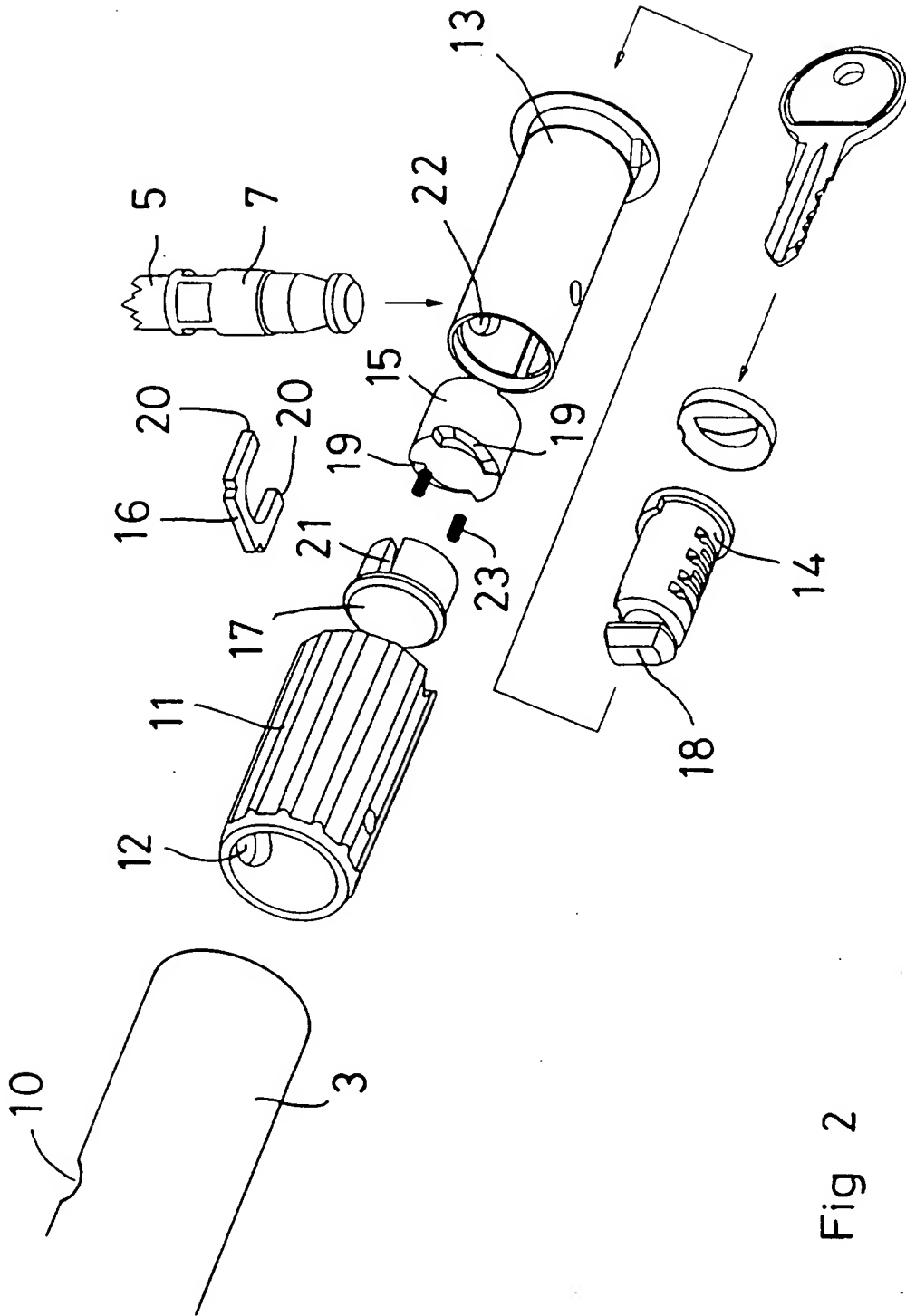


Fig 2

Fig 3

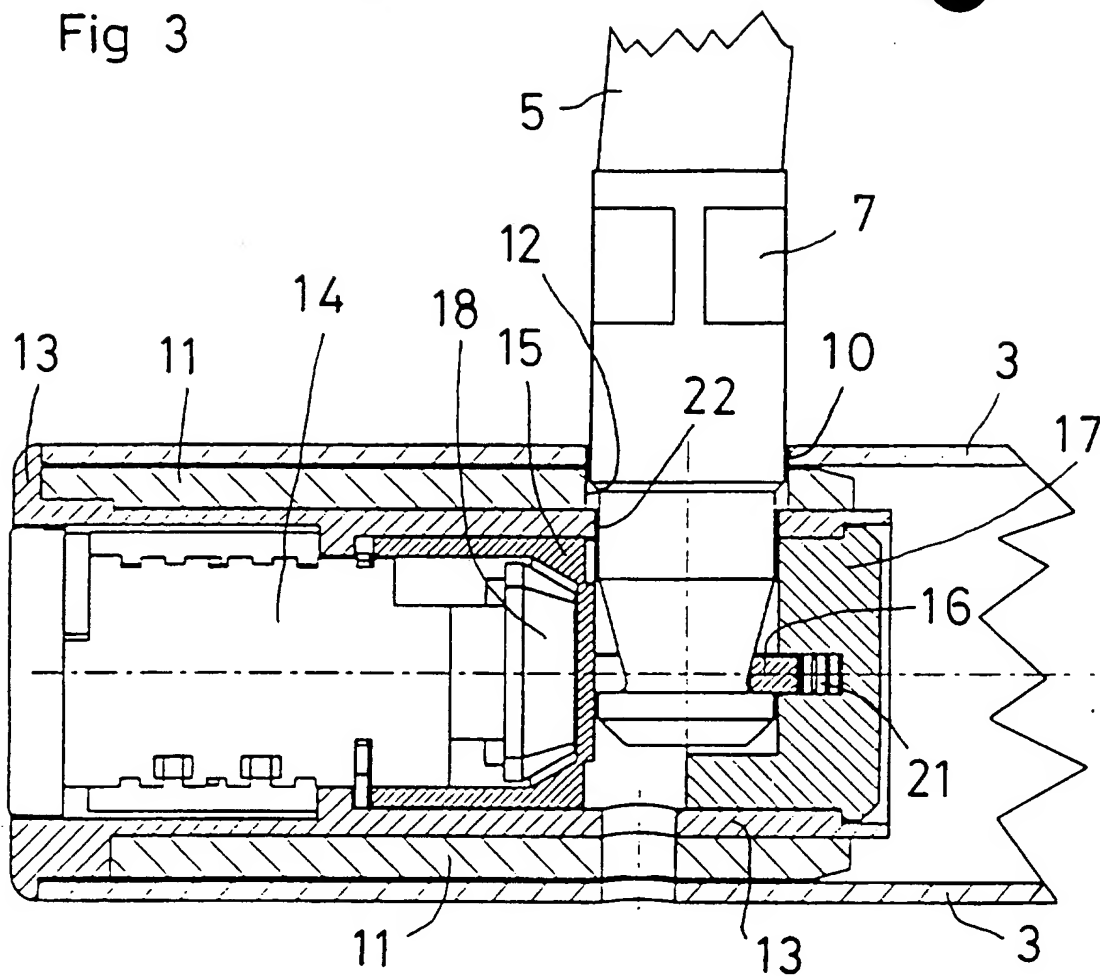
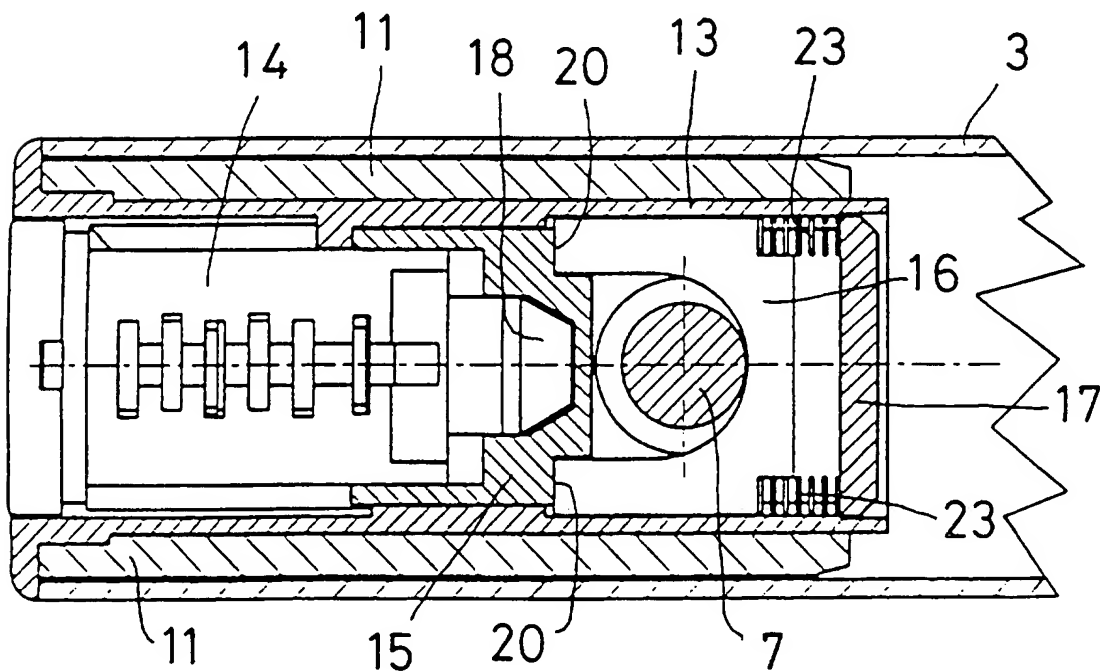


Fig 4



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/001

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B60R 9/10, E05B 67/00, E05B 73/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B60R, E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5373978 A (BUTTCHEM ET AL), 20 December 1994 (20.12.94), column 3, line 51 - line 57 --	1-4
X	DE 3201409 A1 (FRICKE, KARL HEINZ), 8 Sept 1983 (08.09.83), page 1, line 21 - line 39 --	1,2
X	EP 0019873 A1 (HEINRICH ECKEL GMBH & CO KG), 10 December 1980 (10.12.80), page 21, line 7 - line 24 --	1,2
A	WO 8901884 A1 (J.S. PRODUCTS AB), 9 March 1989 (09.03.89), page 4, line 15 - line 28 --	1-4



Further documents are listed in the continuation of Box C.



See patent family annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*&\* document member of the same patent family

Date of the actual completion of the international search

21 May 1996

Date of mailing of the international search report

22 -05- 1996

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer  
Hans Nordström  
Telephone No. +46 8 782 25 00

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00231

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9319269 A1 (TORTOISE PRODUCTS, INC.), 30 Sept 1993 (30.09.93) --	1-4
A	US 4009744 A (JOSLYN), 1 March 1977 (01.03.77) -- -----	1-4

# INTERNATIONAL SEARCH REPORT

Information on patent family members

01/04/96

International application No.

PCT/SE 96/0181

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US-A-	5373978	20/12/94	NONE		
DE-A1-	3201409	08/09/83	NONE		
EP-A1-	0019873	10/12/80	DE-A-	2921703	11/12/80
WO-A1-	8901884	09/03/89	AU-A-	2320388	31/03/89
			DE-U-	8890093	23/08/90
			SE-B-	458847	16/05/89
			SE-A-	8703402	03/03/89
			US-A-	5042705	27/08/91
WO-A1-	9319269	30/09/93	AU-A-	3814193	21/10/93
			CA-A-	2132314	30/09/93
			US-A-	5349834	27/09/94
US-A-	4009744	01/03/77	NONE		

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☒ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**